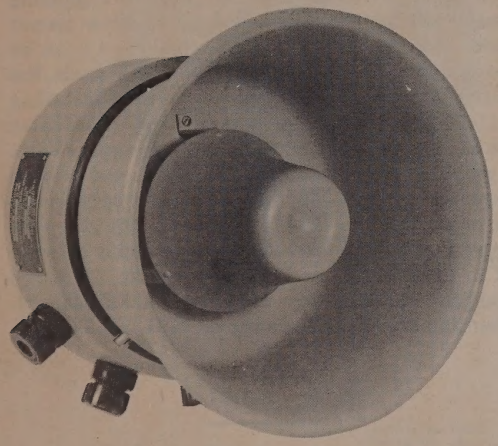
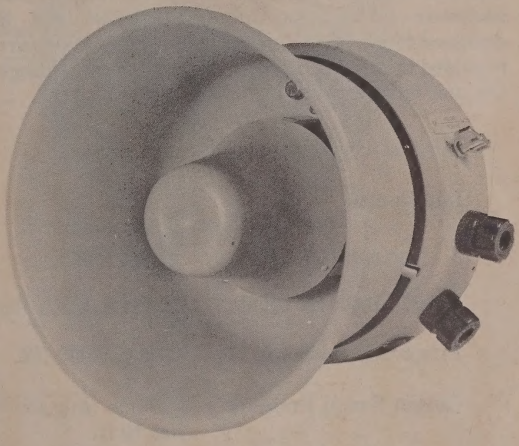
NAVSEA 0965-LP-119-6010

DIS 61716-076

INSTRUCTIONS FOR LOUDSPEAKER, DYNAMIC LS-387/SIC AND LS-388/SIC



LS-387/SIC (IC/SBA-4)



LS-388/SIC (IC/SBG-4)

JANUARY 1976

DYNALEC CORPORATION

SPECIALISTS IN SHIPBOARD INTERIOR COMMUNICATIONS

87 WEST MAIN STREET SODUS, N.Y. 14551 (315) 483 - 6923
(716) 546 - 8168

DESCRIPTION

The LS-387/SIC and LS-388/SIC Loudspeakers are permanent magnet highpower loudspeakers designed for shipboard installation. These loudspeakers provide good speech intelligibility and reproduction of alarm signals in any high noise level area. The LS-387/SIC and LS-388/SIC Loudspeaker Units (Dynalec Part No's. 61716-000 and 61716-001 respectively) are basically identical except for the means of volume adjustment. The volume level is set internally in the LS-387/SIC unit while an external volume control is provided on the LS-388/SIC loudspeaker case. Both units will operate from either a 50 or 70 volt audio input line.

These units consist of a loudspeaker driver assembly, an audio line matching transformer, a terminal board and a means of volume level selection housed in a re-entrant horn enclosure. The enclosure is of aluminum construction and is designed for bulkhead mounting. Stuffing tubes are provided to allow installation wiring access through the unit enclosure case.

General specifications are listed below:

Impedance	
70 V Input	- 653 Ohms
50 V Input	- 333 Ohms
Rated Electrical Input	- 7.5 VA
Frequency Response	- 500 to 5000 HZ
Output Sound Pressure	- 106 db (avg.) at 10 ft. (ref. 0.0002 dynes cm^2)
Volume Selection	- 5 Levels in 6 db Steps
Overall Dimensions	- 12 1/2 in. W x 10 in. D
Weight	
Uncrated	- 12 Pounds (5.4 Kg)
Crated	- 16 Pounds (7.3 Kg)

OPERATION

A VOLUME INCREASE control is located on the lower right side of the LS-388/SIC case. This control is a five position rotary switch which provides a means of selecting up to five (5) volume levels in 6 db steps. Loudspeaker output is increased from -24 db to full volume as the control is turned clockwise. No off position is provided. This volume control is not provided in the LS-387/SIC Loudspeaker. The desired output level for this unit is selected by means of internal wiring made during installation.

INSTALLATION

The loudspeaker should be mounted so that the space in front is clear of obstructions and the speaker axis is directed toward the center of the area to be covered. The unit enclosure stuffing tubes must be directed downward to allow proper water drainage. Mounting to a bulkhead is to be accomplished with three 3/8-inch bolts or studs, flat washers and lockwashers supplied by the installing activity as appropriate to the particular installation. Access to the enclosure mounting holes is gained by removing the outer loudspeaker horn assembly. Remove the three hex-head bolts inside the outer horn that fasten the horn to the case (see figure 1). Then lift the outer horn assembly directly off to clear the inner horn and expose the three mounting holes inside the case (see figure 2). Mounting dimensions are shown in figure 3.

WARNING

Hazardous voltages may be present on the audio systems output lines to this unit. Verify that the audio system is turned off before attempting installation wiring.

Remove the caps(s) from one or two stuffing tubes as required. Draw the audio Signal line(s) through the cap and through the stuffing tube packing to the terminal board inside the case. Tighten the stuffing

continued on page 6.

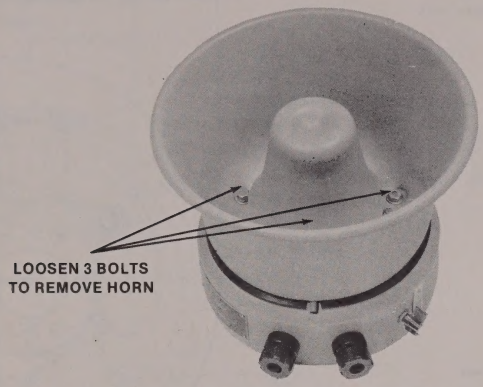


FIGURE 1. LOUDSPEAKER HORN REMOVAL

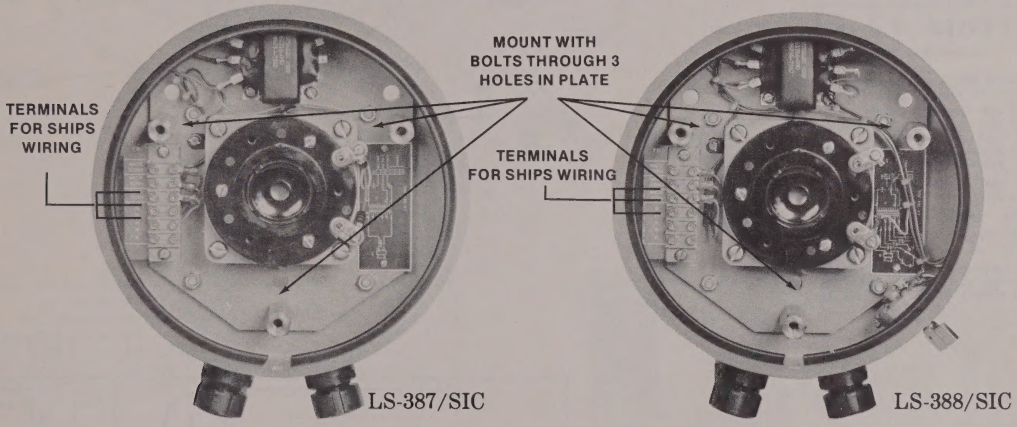


FIGURE 2. LOUDSPEAKER CASE (OPEN)

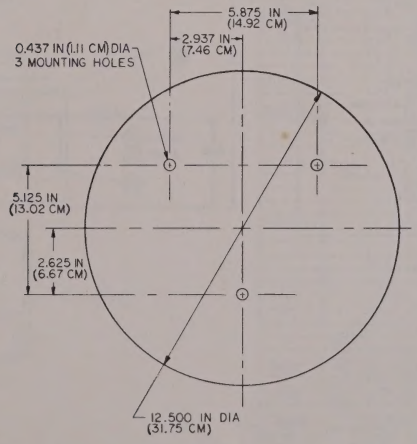


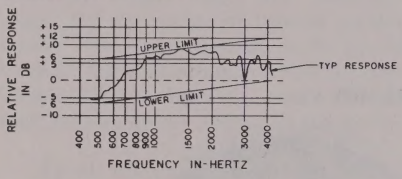
FIGURE 3. MOUNTING DIMENSIONS

NOTES :

1. THIS EQUIPMENT IS IN ACCORDANCE WITH CONTRACT SPECIFICATION 1904-6178C-02 NAVAL SHIP ENGINEERING CENTER.
2. MATERIAL (ENCLOSURE)
   ALUMINUM PER QQ-A-250
3. FINISH (ENCLOSURE)
   ANODIC TREATMENT PER MIL-A-8625
   PRIMER PRETREATMENTMENT PER MIL-P-15328
   GRAY ENAMEL PER MIL-E-15090
4. SHOCK TESTED IN ACCORDANCE WITH MIL-S-901C.
   4.1 GRADE A
   4.2 LIGHTWEIGHT MACHINE, FIG. 5, FIXTURE 4A
5. MINIMUM SOUND PRESSURE DISTRIBUTION FOR 800 1250 HZ WARBLE BAND AT 10 FEET WITH 70 VRMS INPUT.

OFF AXIS HORIZONAL PLANE		OFF AXIS VERTICAL PLANE	
± 15°	± 30°	± 15°	± 30°
106.5 DB	103.0 DB	106.5 DB	103.0 DB

6. FREQUENCY RESPONSE LIMITS.

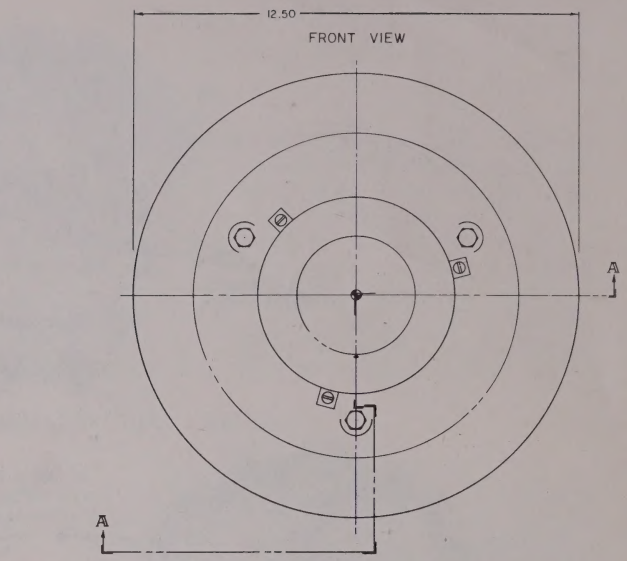


7. MINIMUM SOUND PRESSURE OUTPUT AT 10 FEET ON AXIS WITH 70 VRMS INPUT.

WARBLE BANDS	500 - 800 HZ	104 DB
	800 - 1250 HZ	108 DB
	1250 - 2000 HZ	109 DB
	2000 - 3200 HZ	106 DB
	3200 - 5000 HZ	104 DB

DB'S FOR SOUND PRESSURE ARE REFERENCED TO 0.0002 DYNES / CM^2

8. ⊕ DENOTES CENTER OF GRAVITY
9. STICK STAMP 1/8 INCH HIGH BLACK CHARACTERS APPROXIMATELY AS SHOWN.
10. REFERENCE DRAWINGS
    61716-095 WIRING DIAGRAM LS-387/SIC
    61716-096 WIRING DIAGRAM LS-388/SIC



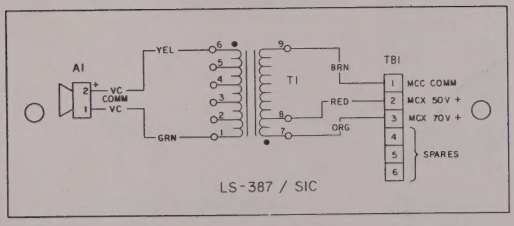
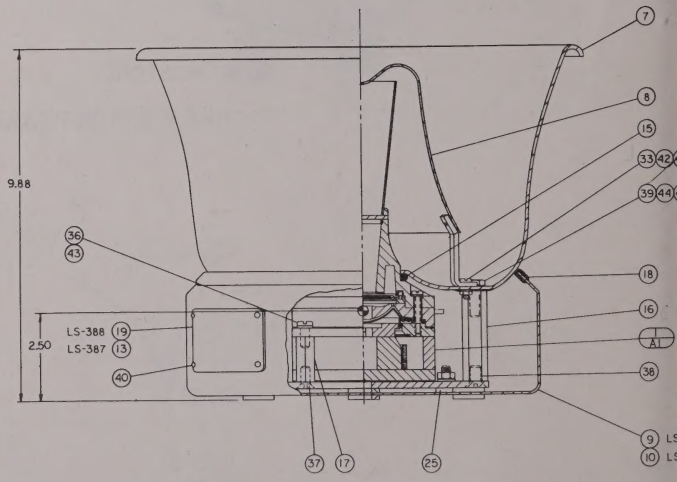
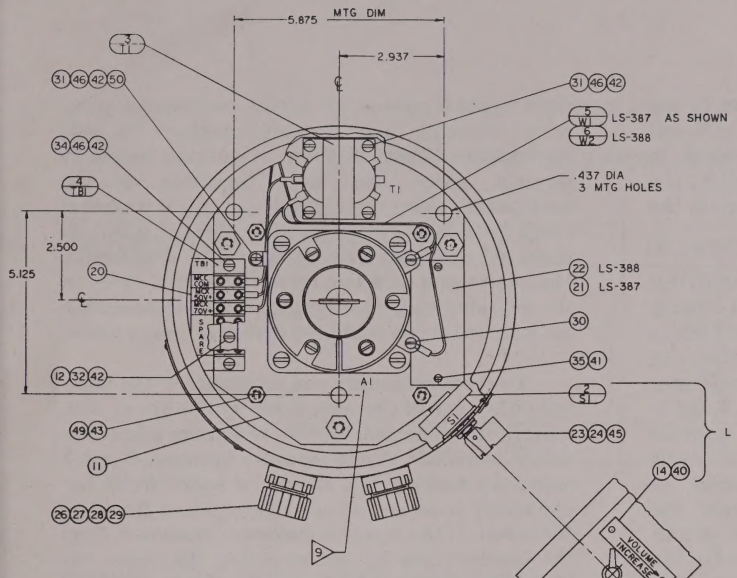


PLATE SCHEMATIC, ITEM NO 21 (REF)



VIEW A-A



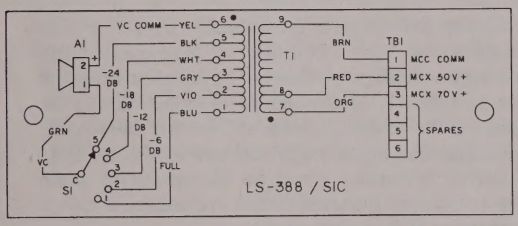
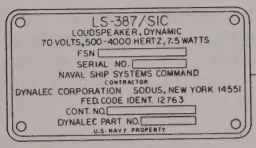
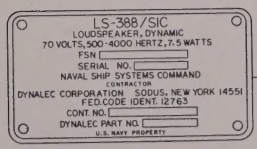


PLATE SCHEMATIC, ITEM NO 22 (REF)
SCALE 4:1





NAMEPLATE

PP2		1	1	50	83330	MIL N 18352	12510-002	CLAMP CABLE
MS 35690-410		4	4	49	81349	MS 35690	12301-006	NUT HEX 1/4-20
MS 35649-84		3	3	48		MS 35649	12301-004	NUT HEX 8-32
MS15795-812		3	3	47		MS15795	12211-012	WASHER FLAT 5/16
MS15795-807		7	7	46		MS15795	12211-007	WASHER FLAT NO 8
MS 35333-76			1	45		MS 35333	12201-008	WASHER LOCK INT TOOTH 3/8
MS 35338-83		3	3	44		MS 35338	12203-007	WASHER LOCK 5/16
MS 35338-82		8	8	43		MS 35338	12203-006	WASHER LOCK 1/4
MS 35338-80		12	12	42		MS 35338	12203-004	WASHER LOCK NO 8
MS 35338-78		2	2	41	81349	MS 35338	12203-002	WASHER LOCK NO 4
0-3/16		4	6	40	45722	COML	12520-005	DRIVE SCREW
		3	3	39	81349	QQ-S-763	12175-006	SCREW 5/16 X 7/8 HEX HD
MS35249-102		3	3	38		MS35249	12171-004	SCREW 5/16 X 5/8 FLH
MS35249-87		4	4	37		MS35249	12141-004	SCREW 1/4-20 X 5/8 FLH
MS35233-80		4	4	36		MS35233	12146-004	SCREW 1/4-20 X 5/8 PNH
	-13	2	2	35			12106-001	SCREW 4-40 X 1/4 PNH
	-46	2	2	34			12126-004	SCREW 8-32 X 5/8 PNH
	-45	3	3	33			12126-003	SCREW 8-32 X 1/2 PNH
	-43	2	2	32			12126-002	SCREW 8-32 X 3/8 PNH
	-42	5	5	31			12126-022	SCREW 8-32 X 5/16 PNH
MS35233-40		2	2	30		MS35233	12126-021	SCREW 8-32 X 3/16 PNH
		2	2	29		AN5227	60169-004	O-RING STUFFING TUBE
		2	2	28		MS16170	60169-003	CAP STUFFING TUBE
		2	2	27		MS16169	60169-002	NUT STUFFING TUBE
		2	2	26	81349	MS16168	60169-001	BODY STUFFING TUBE
		4	4	25	12763	QQ-A-250	61691-033	SPACER
			1	24	12763	QQ-Z-363	61691-013	KNOB SWITCH
79-018-078-0375			1	23	72962	MIL-P-10971	61690-105	ROLLPIN
			1	22	12763	QQ-N-281	61716-074	PLATE SCHEMATIC LS-388
		1		21		QQ-N-281	61716-073	PLATE SCHEMATIC LS-387
		1	1	20		MIL-P-3115	61716-072	STRIP TERMINAL MARKER
			1	19		QQ-N-281	61716-067	NAMEPLATE LS-388
		1	1	18		COML	61716-065	CHANNEL EXTRUDED 2? 1/2 IN LG
		4	4	17		QQ-S-764	61716-053	STANDOFF 1/2 HEX X 1 1/4 IN LG
		3	3	16	12763	QQ-S-764	61716-052	STANDOFF 5/8 HEX X 2 17/32 IN LG
AN 6227B-33		1	1	15	02697	MIL-P-5516	61716-046	O-RING
			1	14	12763	QQ-N-281	61716-045	NAMESTRIP VOLUME INCREASE
		1		13		QQ-N-281	61716-044	NAMEPLATE LS-387
		1	1	12		QQ-S-766	61716-011	BRACKET MTG
		1	1	11		QQ-A-250	61716-006	PLATE MTG
			1	10		QQ-A-250	61716-005	CASE LS-388
		1		9		QQ-A-250	61716-004	CASE LS-387
		1	1	8		QQ-A-250	61716-061	HORN SECTION CENTER W/MTG BRKT
		1	1	7		QQ-A-250	61716-060	HORN SECTION OUTER W/PIN
	W1		1	6		MIL-W-16878	61716-070	CABLE ASSY LS-388
	W1	1		5	12763	MIL-W-16878	61716-068	CABLE ASSY LS-387
8TB6	TB1	1	1	4	75382	MIL-T-16784	14052-004	TERMINAL BLOCK 6 PLACES
	T1	1	1	3	12763	MIL-T-27A	61716-050	TRANSFORMER
111-5	S1		1	2	44655	MIL-S-3786	61716-056	SWITCH 5 POS, 15 AMP, 125V
	A1	1	1	1	12763		61716-064	DRIVER UNIT ASSY

61716-000 LS-387	61716-001 LS-388	ITEM NO.	CODE IDENT	SPECIFICATION	PART NUMBER	DESCRIPTION

LIST OF MATERIAL

VENDOR MIL PART NO | REF DES

LS-387/SIC, LS-388/SIC Loudspeaker Assembly and Schematic Diagram

tube cap securely. Connect the audio line to the terminal board as follows (see figure 2). If a 70 volt audio line is used, connect the input leads to terminals marked MCC COM and MCX 70V+. If a 50 volt line is used, connect the input leads to the MCC COM and MCX 50V+ terminals.

The output volume on the LS-387/SIC Loudspeaker is determined by internal wiring which must be connected before the front horn is replaced. Set the volume level by connecting the green voice coil lead to one of the five transformer output terminals that are numbered 1, 2, 3, 4 and 5. These terminals, when connected, will provide Odb, -6db, -12db, -18db, and -24db volume levels respectively. As the lead is connected to progressively higher numerical terminals the volume is decreased. The most desireable output level will be dictated by the conditions accompanying the specific installation.

Replace the outer horn on the case with the horn locating pin turned downward in alignment with the slot in the case. Replace the three flat washers, lockwashers and hex-head bolts that attach the horn to the case. Gradually tighten the three bolts alternately until they are tightly secured and the seals compressed.

MAINTENANCE

The only preventative maintenance required for the loudspeakers is periodic cleaning and checking for physical damage.

TROUBLESHOOTING

If the loudspeaker does not operate properly under any conditions, check to be sure the audio input signal is normal. To do this, remove the outer horn assembly and connect another 70 volt loudspeaker (which is know to operate properly) directly across the input terminals of the loudspeaker under test. If the input signal is normal check for a defective driver unit. Erratic, noisy, or distorted operation may be caused by a defective blast valve or a defective driver assembly. Refer to the following major paragraph on unit disassembly for instructions on replacing defective components.

To check continuity and resistance of the voice coil either one of the wire leads to the driver unit must be disconnected. The DC resistance across the driver terminals should measure between 6 and 7 ohms. An audible click should be heard when the ohmmeter is connected and disconnected from the terminals. If the driver is defective remove it from the speaker case by disconnecting the voice coil leads and removing the four pan-head screws that attach the driver to the mounting plate standoffs. Transfer the throat and inner horn assembly, the blast valve and the gasket to a new driver unit and replace it in the loudspeaker base.

If the driver unit is normal, check the DC resistance of the transformer primary and secondary windings. A chart of resistance values is given in table 1. Measured resistances should be within ±20% of the values shown on the chart. Both audio line input leads and one of the leads to the driver terminals must be disconnected while these resistance measurements are taken. Replace transformer if it is defective.

If the cause of difficulty has not been found by the above procedure, check all wiring and connections for possible open or short circuits.

TABLE 1

TRANSFORMER ELECTRICAL CHARACTERISTICS

	PRIMARY			SECONDARY	
TERMINALS	IMPEDANCE*	DCR	TERMINALS	IMPEDANCE*	DCR
9-7	653	39.4	6-1 6-2 6-3 6-4 6-5	10.50 1.88 0.40 0.10 0.03	.76 0.32 0.15 0.07 0.03
9-8	333	28.1	6-1	10.50	0.76

* At .1KHZ

DRIVER AND HORN UNIT DISASSEMBLY AND REPAIR

The Driver unit should be placed on a clean non-magnetic surface for disassembly. Remove all traces of dirt and magnetic particles from the outside of the assembly. The major components comprising the driver and inner horn assembly are illustrated in figure 4. Remove the 3 screws (2) holding the throat and inner horn assembly (1), blast valve assembly (3), and gasket (4) in position. Carefully separate the parts and examine them.

NOTE

Do not remove the gasket cemented inside the throat assembly as the loudspeaker will not operate properly if this gasket is missing.

The diaphragm in the blast valve must be free to move at right angles to the diaphragm surface and it must spring back to a center position. Replace the blast valve assembly if defective. To re-assemble, align the two pins on the blast valve so that they point away from the driver assembly and fit into the two holes in the throat and inner horn assembly. The gasket is fitted between the back of the blast valve assembly and the front of the driver assembly. Replace the screws and re-install the driver in the loudspeaker case.

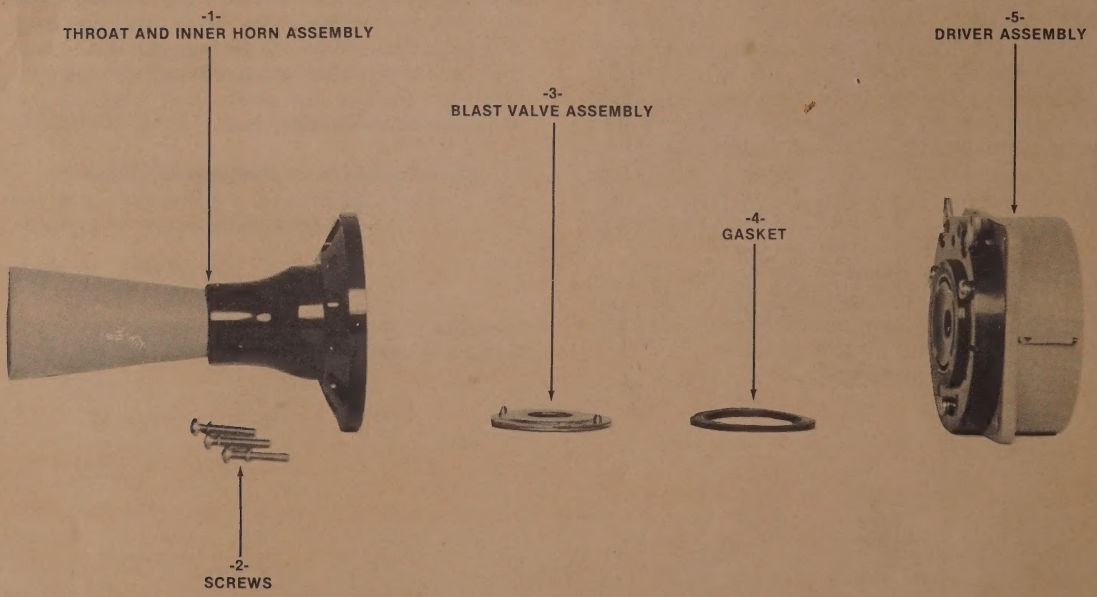
Refer to table 2 for the repair parts list.

TABLE 2

REPAIR PARTS LIST

DESCRIPTION	FUNCTION	MANUFACTURER'S NAME FEDERAL IDENT. CODE	MANUFACTURER'S PART NO. NATIONAL STOCK NO.
Driver Unit	Convert Electrical Audio Input to Accoustical Output.	Dynalec Corp. 12763	61716-097 9N5965-00-134-0287
Blast Valve	Protects diaphragm from gun blast pressure.	Dynalec Corp. 12763	61716-038 9N5965-00-134-0285
Transformer	Matches Loudspeaker voice coil to audio signal line.	Dynalec Corp. 12763	61716-050 9N5950-00-106-2718
Switch	For volume adjustment (on LS-388/SIC only).	Dynalec Corp. 12763	61716-056 9N5950-00-114-4388

FIGURE 4.
DRIVER AND INNER HORN ASSEMBLY



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